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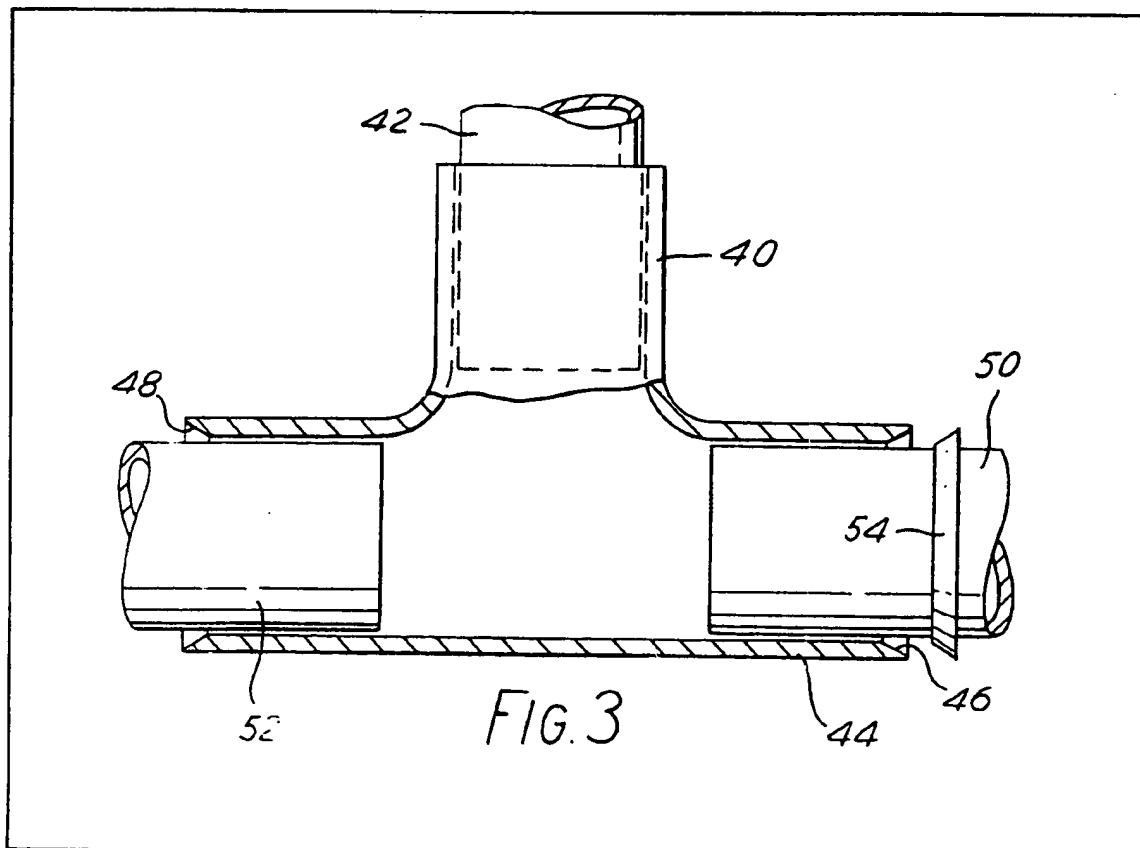
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(54) Soldered joint for copper pipes

(57) A method of making a joint between a fitting and a pipe includes providing the fitting with an inwardly-chamfered open end (46), encircling the pipe with a ring of solder (54), and entering the pipe into the fitting. The ring of solder is moved along the pipe towards the fitting until it at least partly occupies the space bounded by the chamfer, the pipe is heated at a region spaced from the fitting so that the solder spreads into the space between the confronting surfaces of the pipe and the fitting and bonds them together.

The chamfer on the open end of the fitting may for example be such as to provide a surface at from about 20 to 40 degrees to the axis of the fitting.



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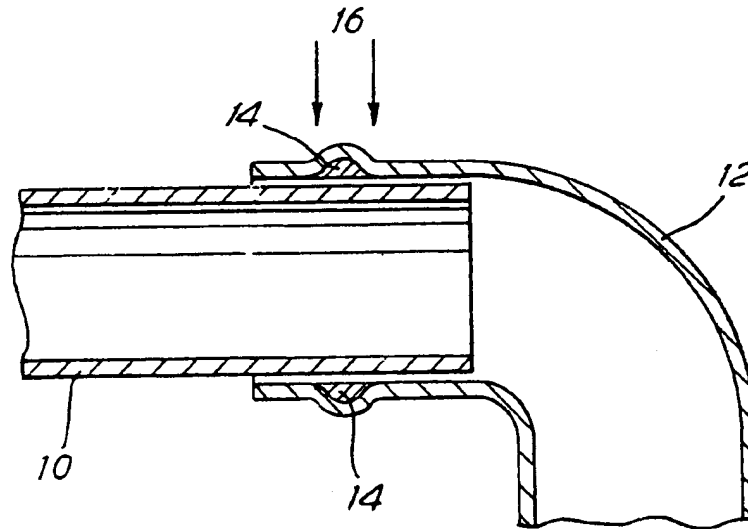


FIG. 1

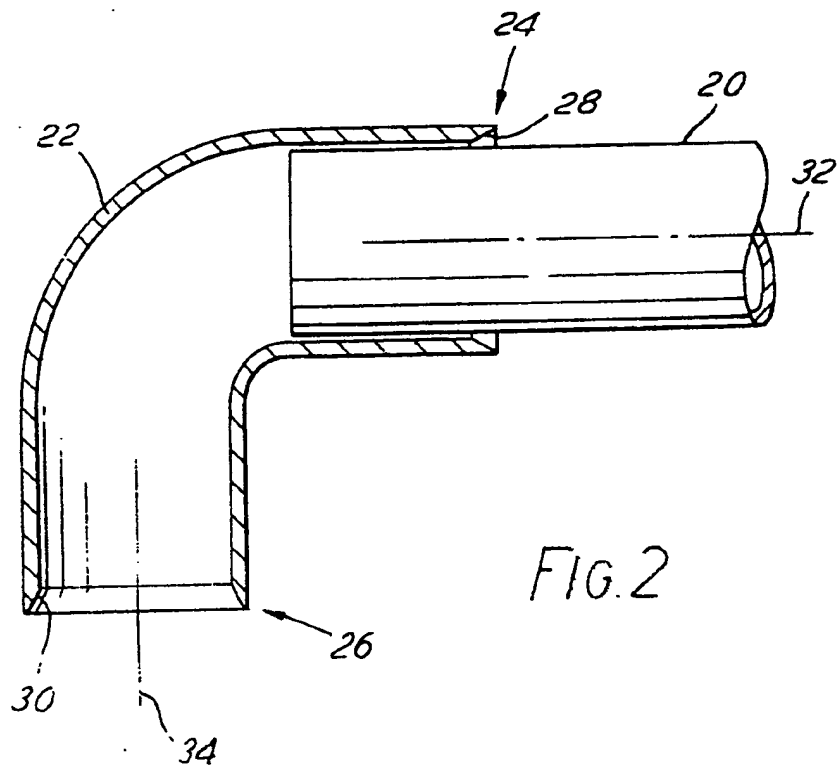
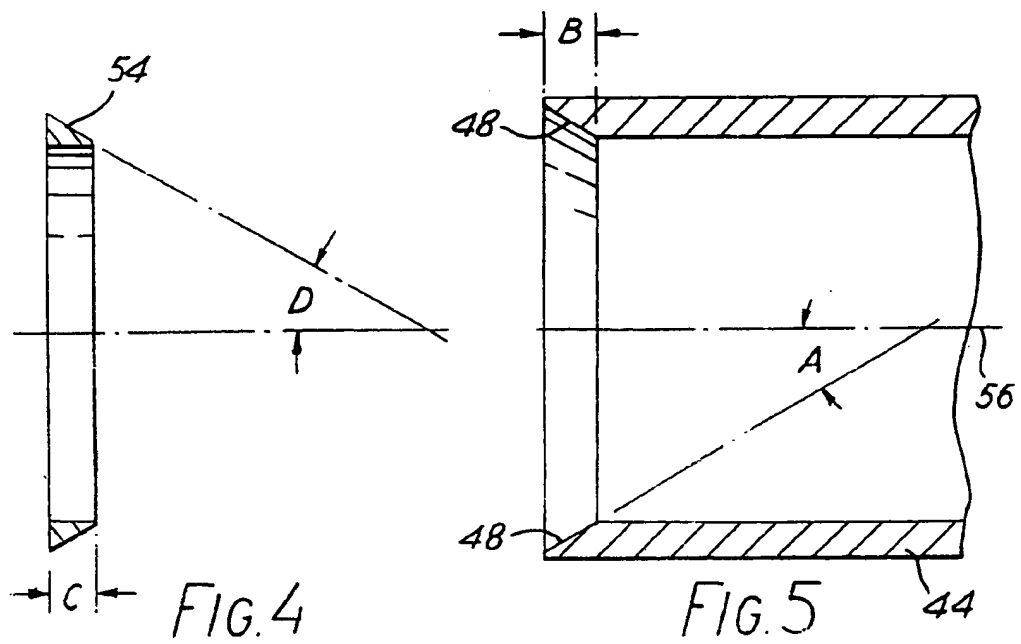
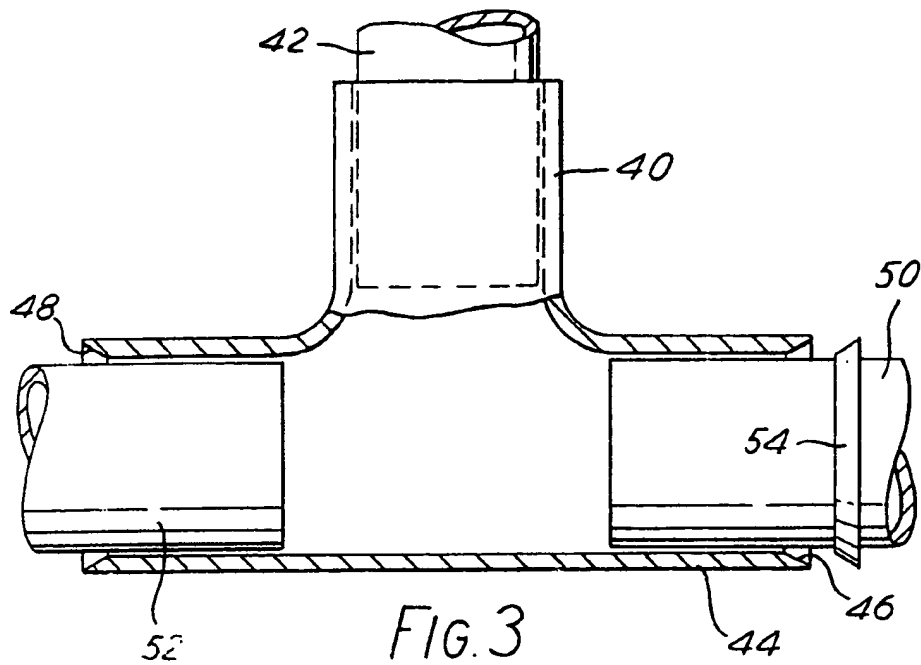


FIG. 2



SPECIFICATION

Joint for copper pipes and method of making same

- 5 This invention relates to a joint for copper pipes and method of making same.
In this specification, the term "copper pipe" is intended to cover both pipes made of copper and copper alloys.
- 10 In the past, joints have been made in copper pipes using a fitting known as a "Yorkshire fitting". This is illustrated in Figure 1 of the accompanying drawings which shows a pipe end 10 inserted in a "Yorkshire" fitting 12. The fitting 12 has an I.D. very slightly larger than the O.D. of the pipe 10. It has an internal annular recess 14 which contains solder. In use, the pipe 10 is inserted in the fitting 12 and heat is applied (at 16) by any suitable means such as a blowlamp or a gas-fired torch. The solder in the recess 14 melts, spreads
- 20 between the confronting surfaces of the pipe end and the fitting, and, when it solidifies again, bonds the pipe to the fitting. A disadvantage of this fitting is that it is easy for an unskilled person to overheat the joint with the result that too much of the solder runs out as a liquid, leaving a part of the circumference "dry" and therefore producing a leaky joint. Also even if the joint does not leak, the solder which has run out tends to solidify on the outside of the pipe and spoil the appearance of the joint.
- 30 According to the present invention, a method of making a joint between a fitting and a pipe includes providing the fitting with an inwardly-chamfered open end, encircling the pipe with a ring of solder material, entering the pipe into the fitting, moving the ring of solder material along the pipe towards the fitting until it at least partly occupies the space bounded by the chamfer, and heating the pipe at a region spaced from the fitting so that the solder spreads into the space between the confronting surfaces of the pipe and the fitting and bonds them together.
- 40 According to the present invention, a joint between a pipe and a fitting is characterised by solder disposed in a bell-mouthed recess in an open end of the fitting. Further according to the invention, a fitting for making a joint with a pipe whose end is placed therein as provided with a chamfer on the internal circumferential edge of the open end of the fitting. The purpose of this chamfer is to partly define a space which is occupied in the making of the joint by a ring of solder.
- 50 The ring of solder preferably has a triangular cross-section taken in a radial plane; its internal diameter is preferably such that it will slide easily along the pipe when pushed by a finger but subject to this requirement the fit should be as tight as possible.
- 55 The chamfer on the open end of the fitting may for example be such as to provide a surface at from about 20 to 40 degrees to the axis of the fitting, although other chamfer angles may be used. The length of the chamfer longitudinally of the fitting axis will depend on the diameter of the fitting but in general it should be from 20 to 35% of the I.D. of the fitting. For example, in a fitting having a nominal I.D. of 12.7 m.m. (1/2 inch) a chamfer length of about 3.0 m.m. (measured axially) is satisfactory.
- 65 The invention will be better understood from the

following non-limiting description of examples thereof given with reference to the accompanying drawings in which:—

- 70 *Figure 1* is (as stated) a cross-section in an axial plane of a joint according to the prior art;
Figure 2 is a similar cross-section of one example of a right angle "L" fitting according to the invention;
Figure 3 is a similar cross-section of a "T" fitting of which the two opposed ends of the bar of the T have respective chamfers according to the invention;
- 75 *Figure 4* is a cross-section in an axial plane of one example of solder ring which can be used in the method of the invention; and
Figure 5 is a similar view on an enlarged scale illustrating one suitable chamfer. In the drawings, like parts are denoted by like reference numerals.
- 80 One embodiment of the invention is shown in *Figure 2* in which is seen a copper pipe 20 and a copper "L" fitting 22. The ends 24 and 26 of this example of the fitting are chamfered as seen at 28 and 30 at an angle of about 30 degrees to the relevant axis 32 and 34 as the case may be. The ring of solder is not shown in *Figure 2*.
- 85 The fitting shown in *Figure 3* is a "T" fitting having a stem 40 fixed to a pipe 42 in any convenient manner (e.g. by using the method of the present invention) and a cross portion 44. The opposed ends of the cross portion 44 are chamfered on their internal edges as shown at 46, 48. Pipe ends 50, 52 extend into the two ends of the cross portion 44. A solder ring 54 surrounds the pipe end 50 and a like ring (not shown) surrounds the pipe end 52. The chamfer 48 is seen in greater detail in *Figure 5* and is formed by an annular surface at an angle A to the axis 56 of the cross portion 44. The angle A in this example of the invention is within the range 20° to 40° but any suitable chamfer angle may be used. The length B is preferably about 3 mm. in a cross portion of I.D. 12.7 mm. A longer length of chamfer B would be appropriate in a cross portion having a greater I.D. (1/2 inch). The axial length C of the ring 54 (*Figure 4*) is preferably equal to or slightly less than the length B, and the angle D may be the same as, or a few degrees less than, the angle A.
- 100 In operation, the pipe end 50 is pushed into the end of the cross portion 44 and the solder ring 54 is pushed by the fingers along the pipe until it seats in and is located within the space defined by the pipe and the outwardly-flaring inner wall of the chamfer 46, 48 as the case may be. The heat is applied to the pipe 50 by any suitable heat source, e.g. a gas torch at a point about one or two inches (2 1/2 to 5 cms) from the fitting. The heat is conducted along the pipe 50 and melts the solder, which, once liquid, tends to migrate towards the thin space between the main part of the fitting 44 and the pipe poking into it. The inventor does not wish to be bound by any particular scientific interpretation of this phenomenon but believes that it is due at least in part to capillary action. The migration has been found to occur even when the pipe 50 is vertical, extending upwardly into a fitting 44. It is preferred not to apply any substantial heat to the fitting, in contrast to the procedure that it is necessary to employ with certain prior known fittings (*Figure 1*).
- 105 A similar method of operation is used to make a right-angle joint using an L shaped fitting as shown in

Figure 2. The heat need only be applied to the pipe for a short time, for example up to one minute, and when the solder ring is observed to be melting, it is preferred but not essential that the torch or blowlamp be applied to the exterior of the fitting for a very short time, for example one or two seconds only.

CLAIMS (filed on 30.9.1982)

1. A method of making a joint between a fitting and a pipe includes providing the fitting with an inwardly-chamfered open end, encircling the pipe with a ring of solder material, entering the pipe into the fitting, moving the ring of solder material along the pipe towards the fitting until it at least partly occupies the space bounded by the chamfer, and heating the pipe at a region spaced from the fitting so that the solder spreads into the space between the confronting surfaces of the pipe and the fitting and bonds them together.
2. A joint between a pipe and a fitting characterised by a ring of solder disposed in a bell-mouthed recess in an open end of the fitting.
3. A fitting for making a joint with a pipe whose end is placed therein is provided with a chamfer on the internal circumferential edge of the open end of the fitting, the chamfer being such as to partly define a space which is occupied in the making of the joint by a ring of solder.
4. A joint according to claim 2 in which the ring of solder has a triangular cross-section taken in a radial plane; and in which the internal diameter of the solder ring is such that it will slide easily along the pipe when pushed by a finger but subject to this requirement the fit should be as tight as possible.
5. A fitting according to claim 3 in which the chamfer on the open end of the fitting is such as to provide a surface at from about 20 to 40 degrees to the axis of the fitting.
6. A fitting according to claim 3 or claim 5 in which the length of the chamfer longitudinally of the fitting axis is from 20 to 35% of the I.D. of the fitting.
7. A fitting substantially as described and illustrated herein.
8. A joint substantially as described and illustrated herein.

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